NASA LCLUC Program and Objectives of the meeting

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Brief Introduction

M.S. in Meteorology (Russia, 1976)
Ph.D. in Climate Modeling (Israel, 1984)
Post-doc @ NOAA/NESDIS (1985-1990)
Employed by NOAA/NESDIS (1990-1999)

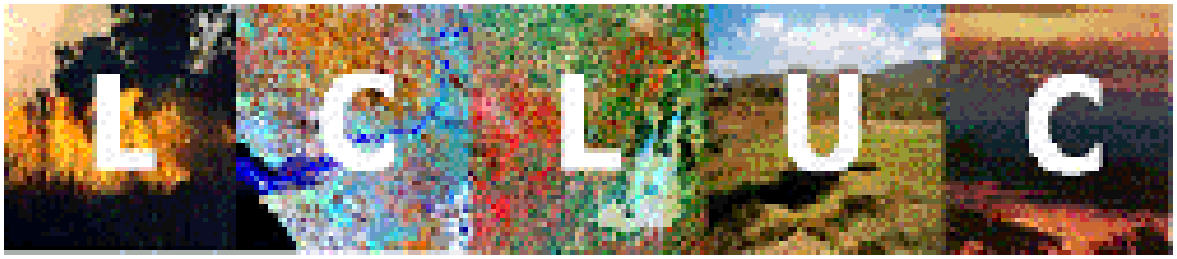
Romantic researcher

Managing LCLUC program @ NASA HQ
(Sep ‘99- present)

Stressed manager

Objectives of the Meeting

- The NASA LCLUC program status
  - What have we accomplished? Where are we now? Where are we going?
- NRA-2000
- Related projects/programs
  - Global Observations of Forest Cover (GOFC) project
  - US Forest Service projects
- Plans and preliminary results of the new LCLUC projects
- Summary of the discussions, recommendations



NASA's Land Cover Land Use Change Program Goals:

- Develop the capability to perform repeated global inventories of land-use and land-cover from space,

- Develop the scientific understanding and models necessary to simulate the processes taking place

- Evaluate the consequences of observed and predicted changes

- Further the understanding of the consequences of land-use and land-cover changes on environmental goods and services, the carbon and water cycles and the management of natural resources

- Improve understanding of human interaction with the environment, and thus provide a scientific foundation for sustainability, vulnerability and resilience of land systems and their use.

Program Elements

- Interdisciplinary LCLUC Case Studies
- Global and Regional Data Sets
- Methods and Technique Development
- Strategic Program Linkages
- Program Publications

LCLUC Case Studies

- The program has supported ground-breaking research combining satellite remote sensing, physical and social science to study the process of land use and land cover change and quantify:
  - Agricultural abandonment and forest cover increase in the Midwest, US
  - Grassland to woodland conversion in Southwest US.
  - Trajectories of agricultural expansion in Sonora, Mexico
  - Carbon dynamics in the Amazon Basin
  - Agricultural land conversion in the Pearl River Valley, China
  - Woodland to agriculture conversion in Southern Africa
  - Forest cover change in Guatemala
  - Deforestation in the forests of the Yucatan, Mexico
  - Forest cover changes in Pacific North West and Russian NW

Global and Regional Data Sets

- First systematic validation of a global land cover product
- Generated new global data fields of percentage tree cover
- Regional data sets of forest cover and rates of change for the US Midwest, Mexico, Southern Africa, S.E. Asia
- Inundation maps for Central Africa

New Methods and Technique Development

LCLUC research demonstrated:

- Use of coarse resolution satellite data and mixture modeling for determining global % tree cover
- Use of Landsat for quantifying regional rates of deforestation and regrowth
- Use of Landsat time-series data combined with field inventory data for estimating regional carbon fluxes
- Use of multi-angle and high spatial resolution satellite measurements combined with in-situ data for estimating above ground carbon stocks of woodlands
- Use of moderate resolution satellite data in modeling of fire emissions
- Use of spatially explicit land cover change maps and numerical models to provide spatial and temporal explicit maps of carbon exchange with the atmosphere
- Combined use of remotely sensed data with household surveys to understand drivers of land use change
- Geographically explicit models can be developed for predicting land use change

Publications

- Peer reviewed articles
- Conference articles
- Books, book chapters

Strategic Program Linkages

- Supported Interagency VMAP project – providing input to the National Assessment
- Contributing to the Interagency Carbon Initiative
- **Supported Global Observation of Forest Cover Program(GOFC)**
  - FY 2000 LCLUC/GOFC New Starts
  - Establishing contact with the USFS
  - NASA LCLUC PI's lead the GOFC Land cover and Fire implementation teams
  - Developing African, Southeast Asia, Siberian regional networks
- Contributed to the International LBA program, providing research and core funding
- Supported US representation in the IGBP/IHDP LUCC program

Global Observation of Forest Cover is a panel of the Global Terrestrial Observing System. It was originally developed as a pilot project by the Committee on Earth Observation Satellites, as part of their Integrated Global Observing Strategy. GOFC's overall objective is *to improve the quality and availability of satellite observations of forests at regional and global scales and to produce useful, timely and validated information products from these data (together with in-situ observations) for a wide variety of users*.

- Regional Networks for Implementation of the GOFC Project in the **Tropics**: *Washington, D.C. , March 1999*
- SE Asia Regional GOFC Planning Meeting: *Bogor, Indonesia, January 2000*
- GOFC Central Africa Workshop: *Libreville, Gabon, February 2000*
- Miombo GOFC Coordination Meeting: *Maputo, Mozambique, July 2000*
- GOFC Workshop on **Boreal** Forests: *Novosibirsk, Russia, August 2000*
- Technology demonstration for GOFC: *Bangkok, Thailand, September 2000*

Towards Regional Science Networks for GOFC Support

- Tropical forest regional networks
  - Central Africa
  - Miombo
  - SE Asia
  - Amazonia
- Boreal forest regional networks
  - North America (USA, Canada)
  - Europe (Russia, Finland, Sweden)
  - Siberia (Russia)
  - Far East (Russia, China)

Implementation of the USGCRP in FY 2000

A. Program Elements

- Understanding the Earth's Climate System
- Biology and Biogeochemistry of Ecosystems
  - *Changing Land Use and Land Cover*
  - *Multiple Stresses in Ecosystems*
  - *Changes in the Global Nitrogen Cycle*
- Composition and Chemistry of the Atmosphere
- Paleoenvironment/Paleoclimate
- Human Dimensions of Global Change
- The Global Water Cycle

B. Carbon Cycle Science: An FY 2000 Initiative

NRA-2000

Carbon Cycle Science and related opportunities under

- Terrestrial Ecology
- Land Cover and Land Use Change (LCLUC)
  - synthesis of past LCLUC case study results
  - predictive scenarios of LCLUC
  - the impacts of LCLUC on water resources and their implications for carbon, ecology, and biogeochemistry
- Applications
- LBA-Ecology